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Testimony on California Climate Change Adaptation Strategies

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Thank you for the opportunity to testify before your Commission on the need for California to develop policy approaches in anticipation of the effects of a changing climate. I will begin with my recommendations, followed with a discussion of their origins and a more detailed explanation and rationale for the two that I consider a starting point for charting a fully blown approach to adaptation for the state, in specific, numbers 4 and 5.

Recommendations

1. Monitor: Increase monitoring and data gathering on the uses of, and changes to, the state's natural resources and land-use patterns
2. Communicate and coordinate: Improve communication and coordination across sectors and levels of government for adaptation planning
   (State Adaptation Strategy 2009 and CA Adaptation Task Force 2010)
3. Incentivizing pro-active behavior. Align incentives for proactive adaptive management and funds to support capacity building, outreach, and large-scale infrastructure projects
4. Build institutional capacity: Establish a Climate Risk Council (CRC) for California
   (*CA Adaptation Task Force 2010*)
5. Start with the built environment. Establish a climate change goal for the built environment that balances adaption and development via a 30-year rolling criteria based on the mid-range consensus scientific warming projection
   (*Mazmanian, Jurewitz, and Nelson 2013*)
6. Incentivize resilient and sustainable buildings. Develop commercial and residential building design codes that designate zero GHG emission and energy neutral buildings, and use of fire resistant exterior designs and materials as resilience strategies of benefit to the individual property owner and the state, with incentives to off-set increased construction costs
7. Utilize existing regulations. Incorporate into existing regulations provisions that incentivize individual/private adaptation behavior
   - For example, for the coastal commission, add the need to assess the sea-level rise impact and resultant expected longevity of any requested development or major repair or modification to its permitting decisions

8. Create resilience-based business opportunities. Develop a climate change resilience approach for managing forest and open space vegetation management in anticipation of more frequent extreme forest and rangeland fires
    - For example, this could entail supporting small scale biomass generation and expansion of selective timber cutting on state and private lands as a resilience-based business opportunity
9. Rethink property insurance. Develop an approach to property insurance that incentivizes owners to invest in resilience-based design, operation, and maintenance in anticipation of the increasing occurrence of major forest fire, flooding, droughts, and a warmer climate (*Mazmanian, 2013*)

Introduction

I am a professor of public policy at the USC Sol Price School of Public Policy, focused on the implementation of public policy and, in particular, environmental policy. I became aware of the growing importance of climate change as it was moving center-stage in the scientific community and persuaded of the efficacy of the climate science while serving as the Dean of the School of Natural Resources and the Environment, at the University of Michigan, in the late 1990s. I followed the emergence of the issue in California after returning to the state and assuming the position as Dean of the then USC School of Policy, Planning, and Development (now Price School) in 2000. In 2009-2010 I served as project director for the Task Force on California's Adaptation to Climate Change, a multi-stakeholder group convened by the Pacific Council on International Policy. The Task Force report was embraced by Governor Schwarzenegger, in the winter of 2010, as the report of the Adaptation Advisory Panel to the State of California[i].

California has distinguished itself as a "first mover" in climate change mitigation policy through a series of legislative and executive acts, most notably the California Global Warming Solutions Act of 2006 (AB32), committing the state to dramatic reduction of greenhouse gases (GHG). I appreciate the boldness of the state's mitigation efforts and applaud them in my scholarly writing and presentations on the topic[ii].

What is disheartening in view of California's reputation as an environmental policy leader is the reluctance of the state's policy makers to address as boldly the ramifications of a changing climate that will be visited on the people of California. Moreover, Californian's expect the state policy leaders to be taking action. This is not to say that no one is addressing the importance of adaptation. For instance, in response to the Governor's 2008 executive order the State Resources Agency produced the "2009 State Adaptation Strategy" to help coordinate and guide state agencies in anticipation of climate change, which has been updated periodically. The Bay Area Conservation and Development Commission has devoted extensive effort to the challenges of a changing climate to the San Francisco region, and several local communities have developed local mitigation and adaptation plans, possibly the most impressive being that of San Diego[iii].

Yet, in comparison to what the state is doing to foster mitigation, state policy makers have not developed a comprehensive approach and implementing authority for adaptation commensurate with that for GHG reduction. In specific, the legislature has not established policies and goals nor has the Governor promulgated executive orders for adaptation comparable to the demanding,

quantitative, and highly publicized targets set for GHG emissions reduction. There may be practical and political reasons for this, but that does not justify the failure to act.

Why an Adaptation Policy

Mitigation. The effects of a dramatically changing climate will affect us all, irrespective of personal circumstances, our location on the planet, and any efforts to avoid them. In this sense, it is classic collective action problem of global proportion. The preponderance of scientific assessment contends, moreover, that action is imperative on reducing the emissions of GHGs now to avoid the most drastic changes that are likely to befall us in the longer term, most severely in the second half of the century. In effect, action on GHG reduction is imperative and requires immediate worldwide action, as exemplified by AB32.

Adaptation. By contrast, the effects on the ground of climate change are not being felt nor will they be in the same universal manner across the planet. They will play out differently by location, on differing timelines, with different effects on human settlements and the environment. In effect, they will be more varied and decentralized, and in most instances can and will most likely be addressed more incrementally. What is important is that these policies be developed and enacted in the present to avoid the potentially sever disruptions and catastrophic costs that are likely to occur if we wait until it is too late.

In addressing this issue, my colleagues John Jurewitz and Hal Nelson and I identify two broad categories of adaption responses in our writing on the topic[iv], with differing policy implications: (1) those adaptation actions that can be undertaken by individuals or groups of voluntarily, acting at their own initiative, and (2) those that require or are best carried out as collective (public) activities. The latter requires collective decision making and can encounter significant public opposition. We therefore distinguish the degree of externalities and/or impact associated with each category, yielding four prototypical response patterns. In brief, much of adaptation can be carried out by individuals acting in their own interest, once informed of their vulnerability to climate change, such as fire-proofing one's home and landscape if living in a heavily forested area, which will be especially relevant for those living in the northern part of the state in the foreseeable future. Similarly for groups of property owners who may join together to not only make their homes more resilient to fires, but who undertake vegetation management in the forest surrounding all their homes. What public policy can provide in these two situations is better information about vulnerability to the effects of climate change and good resilience practices in home protection and vegetation management.

When an individual or group acts to protect their own assets in ways that have significant spill-over effects the need for public policy increases significantly. The case of sea-level rise is a case in point. For an individual or group to undertake to build a sea wall to protect their property may have the unwanted effect of reflecting sea water onto others, adversely affecting them as well as potentially altering the marine habitat and the natural the shoreline, which is a constitutionally

protected state asset. How best to address a situation such as this requires a clear public policy consistently applied.

Finally, there are both public and private activities so large and expensive, so impactful, or so controversial with respect to the likely effects climate change will have on them that they require clear public policy guidance of the sort that currently does not exist. It is to the increasing occurrence of these latter two cases – of spill over and size and scale – that underscores the need for state action.

Is it Time to Act?

The answer to the question of when to act depends on how serious one believes the projected rate of climate change, an assessment of the possible effects that will be visited on the people of California, and the cost of inaction. Personally, I believe that it is time to act. More importantly, a large majority of Californian's believe the time has come. According to the latest PPIC survey,

> "Eight in 10 Californians say it is very (53%) or somewhat important (29%) for the state government to pass regulations and spending money now on efforts to prepare for the effects of global warming, such as flooding, storms, and wildfires"[v].

Also, there is ample evidence that California is not alone and that other state and national leaders believe that the time has come, if not overdue, to develop clear and cogent adaptation policies to protect their populations. Two of the more recent and most noteworthy in that they are facing challenges alike in California are the State of Maryland[vi] and New York City[vii]. While the United Sates Congress is not prepared to act, President Obama has made clear that addressing both climate change mitigation and adaptation is a priority for his administration[viii]. There is no shortage of testament from the scientific and policy community that it is time to take action[ix], with fairly comprehensive approaches for what is needed and specific blueprints for how to do[x].

The 9 recommendation laid out above are not intended to be a comprehensive plan or a specific blueprint for adaptation per se, but a set of legislatively actionable items that while incomplete, provide a starting place and would place California on the path to developing a governing framework and approach to adaptation. They are drawn from the best thinking of state agency leaders (the State Adaptation Strategy), arrived at through a stakeholder consensus building process with representatives of key sectors and interest in the state (the CA Task Force Report), my work on assessing climate change policy with two colleagues over the course of the past several (Jurewitz and Nelson), and additional ideas based on my experience working in the field.

Where to Start

While I do not presume to know how to proceed through the legislative process with my recommendations, I do believe that two recommendations of the nine, if adopted, would provide an umbrella state-level governing and policy framework for adaptation and, hopefully, build momentum for the others.

The first (recommendation #4) is to establish a Climate Risk Council (CRC) for California, called for by the California Adaptation Advisory Panel. The Council would compile, organize and assess the rapidly evolving climate science for use within the state, develop and as

information becomes available update risk assessment protocols and guidelines for use in making decisions within the state, conduct public reviews of the guidelines and protocols, and advise public entities responsible for carrying out long-term project reviews with respect to likely climate change impacts. It would be a small entity, lodged in the office of the governor (for a complete description, see *Appendix A*).

The second (recommendation #5) is to provide a quantifiable goal for adaptation actions applicable to the built environment, based on a 30 year time horizon, updated periodically with each successive major report by the International Panel on Climate Change (IPCC) or comparable scientific body[xi]. The thinking behind this proposal is that a pragmatic balance is needed between long-term projections of climate change effects being generated by climate scientists, reaching out to the end of the century, and the nearer term needs of public and private sector decision makers on the ground who are charged with developing and approving major land use, design, and building decisions in the state. Importantly, the public responsibility is to ensure development standards will be raised to the mid-level expectation of climate change effects (the mid-level projections based on the multiple IPCC projections), at the specific location and in view of the characteristics of the proposed project. This would not preclude builders or insurers to build to a more severe or longer-term projection of effects, but it does establish a public policy baseline. Moreover, the baseline itself would be updated every 6 to 7 years (made more or less stringent) based on experience and improved analysis in each successive IPCC report (for or a full explication, see *Appendix B*).

Once again, thank you for the opportunity to present my views.

Appendix A – Excerpted and edited slightly from CAAP Report, draft, June 2010

"Establish a Climate Risk Council (CRC) for California

A significant gap exists today in the ability of planners, developers, and decision makers to interpret and evaluate climate risk, yet this is essential for effective adaptation planning.

There is need, therefore, for an authoritative professional entity to assess climate risks to the built and natural environment throughout the state. We recommend that this be accomplished through creation of a Climate Risk Council (CRC) for California. In brief, the CRC should be a small, innovative, and guiding organization. It should be responsible for assessing what the climate science implies and translating that into risk assessment guidance for decision making. It should ensure that this knowledge is incorporated in thinking and action of all responsible agencies and parties from the local up to the state level. The full range of CRC responsibilities is laid out in the figure below.

Climate Risk Council Responsibilities:

- ❑**Compile, organize and assess** scientific information on accelerating climate change effects at the state and regional levels.
- ❑**Based on best available science, develop and periodically review and update risk assessment protocols and guidelines**:
  - For conducting risk assessments at regional and local levels applicable in state infrastructure planning and regional and local planning:
    - *These should serve the emerging requirement under California Environmental Quality Act (CEQA) and other state planning guidelines for identifying the significant impacts from climate change and for assessing the associated risks (amendment of 15126.2 CEQA).*
    - *The risk guidelines/protocols should also serve to guide the drawing of authoritative climate change effects maps by planning entities.*
  - For risk characterization processes to be used by regional and local planners in adaptation planning:
    - *These processes should be incorporated at all levels of planning and decision making*
  - For costs-effectiveness evaluation of adaptation options on all long-term projects;
- ❑**Conduct a public review process** under the Administrative Procedures Act in development of the protocols and guidelines.
- ❑**Advise public entities** responsible for carrying out long-term projects on how to incorporate risk assessment, risk characterization, and options assessments within their planning procedures and practices.
  - Advise the State Office of the Insurance Commissioner to incorporate the best available risk characterization in the state's regulations pertinent to climate-sensitive insurance products:
    - *The CRC should consult with the private insurance industry, builders, developers, public permitting officers, water, and fire managers, and other relevant entities to develop risk-based approaches for climate change insurance, including incentives for property owners to make risk-reducing investments.*

The CRC should be responsible for understanding and clearly communicating what climate science implies for California. It should build on climate change and impacts research conducted and funded by other state agencies such as the California Energy Commission's Public Interest Energy Research Program (PIER) and related risk assessment capabilities of the state and translate these findings into periodically updated risk estimates that are relevant to specific locations and activities (major infrastructure development, climate risk insurance, and general planning guidance). It should develop protocols, guidelines, and tools for planners at all levels to facilitate assessing climate risks and conducting cost-effectiveness assessments for all major infrastructure and long-term development projects under their jurisdiction. One necessary tool should be a cost-curve assessment. Just as climate change science is evolving, so are the analytical techniques of risk and cost assessment. The CRC should be responsible for incorporating more advanced and encompassing analytical techniques as they prove useful in furthering its mission.

The Council should be a relatively small state entity appointed by the Governor (three to five members, with a designated chair), of high quality, and positioned at a high level in the state. To serve as knowledgeable overseers of CRC activities, council appointees will need to have experience with, and appreciation of, climate change science, risk assessment, and economics. In addition to having the requisite technical proficiency, the council should represent a balance of industry and business, natural resources management, the public health and engineering professions, and the public sector.

The Council will require its own staff and adequate public funding. In particular, the professional staff will need to include persons skilled in risk assessments, development of risk characterization processes, cost-effectiveness, and other relevant long-range analytical techniques, plus persons with the ability to apply the analytics at the various planning scales throughout the state. Some staff members could be drawn from professionals currently within state agencies and departments (e.g., the Energy Commission, the Resources Agency, the Coastal Conservancy, and Cal-EPA). As an alternative to the formation of the Council or as an interim step, its intended functions could be assigned to a working group within the state and needed staff members brought together as an inter-agency working group."

Appendix B – Excerpted and edited slightly from Mazmanian, Jurewitz, and Nelson, draft, forthcoming (see endnote #x)

"Establishing the Goal in Governing Adaptation for the Built Environment

….Given these collective-action considerations, we posit that a numerical goal for adaptation is required, akin to the 2 degree Celsius by 2050 goal for mitigation adopted by the International Panel on Climate Change (IPCC 2007). The IPCC target for mitigation has been widely accepted as an aspirational goal by all the national and sub-national governing bodies that have enacted mitigation policies. Climate change forecasts are presented as a set of scenarios ranging from a high global warming based on 'business as usual' levels to a very optimistic reduction of the anthropogenic release of GHG emissions. Nonetheless, in the face of these multiple scenarios, the 2 degree target serves as a common GHG mitigation goal around the world.

A comparably robust policy goal is needed to guide adaptation policies. As with mitigation there must be a widely recognized scientific body responsible for projecting coming changes; there must be national and sub-national governments prepared to acknowledge the level of threats they are facing; and there must be robust and continuously revisited criteria for development to proceed in the face of those threats. Our framework requires that for any project with an expected lifespan of 30 years or more, its approval must take into account the best scientific estimates of global warming effects--changes such as local temperature, water availability, sea level rise, susceptibility to forest fires, and human habitability in general. The 30-year time horizon requires anticipating future effects while adopting a realistic timeframe for building and investment decisions.

The Role of Climate Change Science

The impacts of climate change need to be estimated at the subnational level to support adequate adaptation planning. To ascertain the best estimates of global warming projections, we identify two linked sources. The first is the work of the IPCC as a point of departure. For the past quarter century, it has provided the best scientifically determined range of potential futures which can serve as the foundation for adaptation planning. The IPCC reports are the result of scientific consensus, recognized worldwide, and the organization has demonstrated staying power. In governing the built environment, two other factors are required. When it comes to development decisions in the built environment, it is beneficial to have a single set of scenario projections upon which to base decisions rather than leaving this matter to the discretion of local developers and decision makers.

For this purpose, we recommend adopting the IPCC's intermediate scenario as the "base-case" scenario for downscaled impact modeling along with somewhat higher and lower scenarios to form the basis of sensitivity analyses to test the robustness of policies. An appropriate intermediate IPCC scenario could be defined as approximating the mid-point between the business-as-usual energy and population growth scenario, at one end, and successful energy technology development at the other of the IPCC range. For example, the middle-range IPCC B2 and A1T scenarios in the 2007 report are likely approximately appropriate intermediate scenarios.

Sensitivity analysis around the intermediate scenario could be used to specify the operational assumptions and adaptation design parameters used by authorizing and permitting agencies in all situations where collective adaptive action is needed. In light of deep uncertainty and non-stationarity, decisions about the built environment need to be reviewed and updated as new IPCC intermediate forecasts becomes available. This approach conforms to adaptive management practices as "learning principles" that are emerging in water resource management.

Second, the framework element begins to address the scale issues that plague adaptation responses. The IPCC intermediate forecast will need to be down-scaled to the governing jurisdictions and specific sites where projects are proposed. For example, if the intermediate scenario forecasts a sea-level rise of 1 meter by 2050 along the coastline of Netherlands (due to coastal land subsidence and higher sea levels), any major public or private development with a lifespan of 30 years or more proposed along the coast would need to demonstrate that it could withstand, at a minimum a 2-meter sea rise, or accept the responsibility and liability for failing to do so. If the intermediate scenario forecasts a sea rise of a 0.5 meter along the west coast of the United States, projects would need to demonstrate the same, but at the lesser level.

The legal issues surrounding government liability for climate change adaptation are beyond the scope of this paper, but covered elsewhere. State and local governments that adopt and implement the minimum standard would not necessarily be immune to civil negligence suits for sea level rise or storm surges, but the standard would demonstrate that jurisdictions exercises reasonable care in protecting property and human safety. In some countries, legislatures have adopted statutes that limit local governments' liability for negligence.

DISCUSSION

There are several legal implications that accompany the governance standard. The framework assumes that the intermediate level of IPCC scenarios represents the best assessment—scientifically speaking—available at the time of a decision. Importantly, once this minimum standard is set, approving agencies would not be able to deny a proposed development based on the failure to meet a projection of more extreme effects, such as a 2-meter sea-level rise along the U.S. west coast. In terms of legal and financial liability, those approving an action and those responsible for building adaptively within the parameters of the intermediate scenario would not be held liable if, during the 30-year life of the project the effects of climate change turned out to more or less severe. Conversely, the approving entity and project developers would be liable for damages from climate change effects during the 30-year period, if they were to approve and develop to a lesser standard of threat protection than indicated necessary by the IPCC intermediate scenario. In essence, the intermediate IPCC scenario would be the lines painted in the road; they do not themselves prevent accidents, but they help sort out the respective liabilities after the fact and, thereby, establish appropriate incentives for exercising due care."

End Notes

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[i] California Adaptation Advisory Panel, "Preparing for the Effects of Climate Change – A Strategy for California, at: http://www.pacificcouncil.org/document.doc?id=183.

[ii] Daniel Mazmanian, John Jurewitz, & Hal Nelson (2008), "California's Climate Change Policy: The Case of a Subnational State Actor Tackling a Global Challenge," THE JOURNAL OF ENVIRONMENT AND DEVELOPMENT 14 (4) and Daniel Mazmanian, Hal Nelson, & John Jurewitz (2013), "Climate Change Policy: A Race to the Top," Ch. 17 in GOVERNING CALIFORNIA: POLITICS, GOVERNMENT AND PUBLIC POLICY IN THE GOLDEN STATE, 3rd Edition.

[iii] The San Diego Foundation (2012),"San Diego's Changing Climate: A Regional Wake-Up Call", at: www.sdfoundation.org.

[iv] Daniel A. Mazmanian, John Jurewitz, & Hal T. Nelson (2013), "The Paradox of 'Acting Globally While Thinking Locally': Discordance in Climate Change Adaptation Policy Formation", THE JOURNAL OF ENVIRONMENT & DEVELOPMENT 22(2):186-206.

[v] PPIC Statewide Survey (July 2013), "Californians and the Environment," Public Policy Institute of California, p. 9.

[vi] Maryland Greenhouse Gas Reduction Plan Released by Governor O'Malley, July 2013; http://www.climatestrategies.us/articles/articles/view/73.

[vii] "PlaNYC – A Stronger More Resilient New York", Progress Report, June 2013, especially Chapter 20 "Implementation" at: http://www.nyc.gov/html/planyc2030/html/publications/publications.shtml.

[viii] Executive Office of the President, "THE PRESIDENT'S CLIMATE ACTION PLAN, June 2013, at: http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.

[ix] Claudia Pahl-Wostl (2009). "A conceptual framework for analyzing adaptive capacity and multi-level learning processes in resource governance regimes", GLOBAL ENVIRONMENTAL CHANGE 19: 354-365.

[x] Adrienne I. Greve and Michael R. Bosswell, "Climate change adaptation," Chapter 16, in Daniel Mazmanian and Hilda Blanco, ed., THE ELGAR COMPANION TO SUSTAINABLE CITIES: STRATEGIES, METHODS, AND OUTLOOK, forthcoming 2014.

[xi] Daniel Mazmanian, John Jurewitz, & Hal Nelson, "A Governing Framework for Climate Change Adaptation for the Built Environment," ECOLOGY AND SOCIETY, forthcoming 2013.